THE REVIEW

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Malleable Talk Is on Methods, Kinds, Anneal

By John W. McBean
Shop Director, Central Technical School

Ontario Chapter — In spite of the rush of war work, Hugh F. Davis of the International Harvester Co., Hamilton, very kindly prepared his paper on "Malleable Iron" two months in advance of schedule to fill an emergency gap for the December meeting.

His talk covered the kinds of malleable produced, furnaces and methods, and the annealing process. The production of a normal, regular cycle, black-heart malleable was described, and the compositions and properties of a variety of irons considered.

The original castings must have most of the carbon either in the form of cementite or pearlite, since the widely scattered free graphite flakes which occur in gray iron would weaken the final structure.

To secure this the carbon should be kept low and the silicon carefully balanced with it. Total silicon and carbon below 3.2% gives high strength; 3.7% total gives greater fluidity, but makes the casting weaker.

Sulphur and manganese must also be balanced, with manganese about 2½ to 3 times the sulphur.

Reverberatory Furnace Used

The reverberatory furnace gives a good control of carbon and other elements, and is used for about 75% of the castings made on this continent. Use of powdered coal and an air blast gives a convenient means of regulating the temperature and proportion of air to fuel for the four phases of warming up the stock, melting down, superheating, and holding.

The charge may contain malleable scrap, steel scrap, and preferably at least two grades of pig for regulating

(Continued on page 4)

Compliments

To U. S. Steel Vice-President R. E. Zimmerman, on his election as president of the American Standards Association.

To A. R. Troiano and A. B. Greninger of Harvard University on the award of the Robert W. Hunt prize of the A I.M.E.

To Chromium Mining and Smelting Corp., Ltd., Hamilton, Canada, on their foresight in reserving a table for ten at the Annual Banquet of the Society to be held in Philadelphia next October.

To General Motors Research Chief Charles F. Kettering, honorary A.S.M. member, on the award of the Holley Medal of the American Society of Mechanical Engineers.

To George L. Norris, on the tribute from the officers and department heads of Vanadium Corp. of America, of which he is chief metallurgical engineer. A luncheon Jan. 10 celebrated the 32nd anniversary of his association with the Corporation and his 75th birthday.

Columbus Honors Harder With "Oscar"

A Set of Rawhide Luggage and a Hollywood "Oscar" Show the Affection and Appreciation of the Columbus Chapter for National President and Past Chapter Chairman, Oscar E. Harder. Ray Frank stands at Dr. Harder's right and C. H. Lorig, chairman, at his left. Oscar's "Oscar" is shown in the inset.

Role of Arc Welding Operator Discussed

By Robert D. Stout
Dept. of Metallurgy, Lehigh University

Lehigh Valley Chapter—C. H. Jennings, of the Westinghouse Electric Co. commenced his talk on "Recent Developments in Arc Welding" presented on Dec. 6 with the paid statement, "There are no new developments in arc welding!"

However, he soon qualified it with a comprehensive survey of the late improvements and trends in the field.

Working on the basis that the principal factors in arc welding are the power equipment, the electrode, the base metal, and the operator, Mr. Jennings proceeded to outline the characteristics that are important in each and the improvements that have been and can yet be made.

In the active discussion which followed, the question of welding the more difficult jobs such as cast iron and malleable iron was brought up, as well as heat treatment after welding.

The controversial point of the importance of the operator in the quality of welding was raised, resulting in a general agreement that the role of the operator is of considerable influence.

Worcester Gives Course Titled 'Information Please'

By Anthony C. Kowalski
Metallographer, Wyman-Gordon Co.

Beginning Tuesday, March 4, the Worcester Chapter of the A.S.M. will conduct a five-lecture educational course entitled "Information Please!"

Each and every member is invited and urged to send in one or more unsigned questions to the secretary or any member of the committee.

On each lecture night a panel will be made up of four experts to answer the questions which have been sent in. Following the answers the meeting will be thrown open for further discussion or questions.

Dates for the course are March 4, 11, 18, 25, and April 1. There will be no charge to Chapter members or guests.

Meetings will be held at the Mechanical Engineering Lecture Hall at Worcester Tech.

A.S.M. President Knows How Stars Of Hollywood Feel

By R. E. Christin
Metallurgist, Columbus Bolt Works Co.

Columbus Chapter—National President Oscar E. Harder now knows how the stars of Hollywood feel when presented with an "Oscar", that coveted symbol of outstanding ability.

Consisting of a statuette of Edgar Bergen's famous character, "Mortimer Snerd", the "Oscar" was presented to Dr. Harder on National Officers' Night, Dec. 10, by Toastmaster Ray Frank of Bonney-Floyd Co. It is equipped with a fishing hat, tackle (with fish), and a saxophone pipe (attachments characteristic of the good Doctor), and is mounted on a base carrying a tablet properly inscribed.

As a token of their affection for their former chairman and national president, the Chapter also gave him a set of rawhide bags, presented by Chairman Clarence Lorig, also of Battelle Memorial Institute.

Sustaining Members were invited to be present at this meeting, and were introduced by Secretary Ernie Christin of The Columbus Bolt Works Co.

The evening would not have been complete without a few anecdotes typical of our one and only "Bill" Eisenman, who also related some of the activities of the National Society.

The evening was concluded with Dr. Harder's talk on "Recent Developments in Metallurgy".

**Western Metal Congress and Exposition
Los Angeles, May 19 to 23, 1941**

Local Talent Attacks Subject Of Cold Work

By Philip C. Rosenthal
University of Wisconsin

Milwaukee Chapter—With a roundup of local talent laying down a barrage of information on cold working, the members felt well fortified for an attack on this important metallurgical stronghold at the Nov. 19 meeting.

The "big guns" at the symposium were Lawrence Heise and Merrill A. Scheil of the A. O. Smith Corp., W. J. Resiner of Globe Steel Tubes Co., and Thomas G. Harvey, late of the University of Wisconsin but now associated with the Monarch Steel Co., Indianapolis, as metallurgical engineer.

Mr. Heise opened up on the subject of "Deep Drawing Steels". Prefacing his remarks with a classification of the various forming processes, he illustrated these by samples of various plant operations, and then discussed the steels used for these jobs.

Tubes Discussed by Resiner

Cold-drawn tubes were next considered by Mr. Resiner. When a hot-drawn tube isn't smooth or machinable or small enough for the purpose intended, cold drawing is the next resort. These, according to Mr. Resiner, are only a few of the reasons for cold drawing.

Mr. Resiner then spoke of some of the problems involved in cold drawing and how they are met. All commercial alloys can be cold drawn into tubes, including most of the stainless type.

The last two papers on the symposium dealt with effects of cold rolling rather than the actual operations. Mr. Scheil contributed an interesting résumé of some of the corrosion effects attributed to cold work.

A stress-corrosion test as carried out at the A. O. Smith Corp. was illustrated and results of some of the tests discussed. Mr. Scheil supplemented his talk with numerous excellent pho-

(Continued on page 5)

Excellent Slides Show Solidification in Ingots

By D. J. Curtin
Metallurgist, Youngstown Sheet & Tube Co.

Mahoning Valley Chapter—Over 150 enthusiastic members and valley steel mill operators were treated to an excellent discussion of "The Ingot Phase and its Relation to Steel Quality" by Emil Gathmann, president of Gathmann Engineering Co., on Dec. 10.

The three types of steel, rimmed, semi-killed and hot-topped, were discussed at length, as were the related topics of mold contour and taper, crystallization, formation of dendrites, planes of weakness and soaking pit practice.

Mr. Gathmann's slides, especially those showing the progress of solidification of wax and low melting alloys and the progress of solidification in full-sized steel ingots, were of particular interest. The latter represented an exceptionally fine piece of work.

In addition Mr. Gathmann reminisced concerning his early trials and tribulations in the mold business, and found many former associates present.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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Cyclotron Used at O.S.U. for "Atom Smashing" Described

By J. M. Gotshall
General Foreman, Timken Roller Bearing Co.

Canton-Massillon Chapter—Dr. M. L. Pool, associate professor of physics at Ohio State University, talking on "The Cyclotron and Modern Alchemy", was the principal speaker at the meeting on Nov. 7.

He spoke of the extremely high voltage required to break through the shell of electrons in order to attach the nucleus of the atom and reviewed the various apparatus for attaining these high voltages.

He explained the construction and operation of the cyclotron which he is now using at Ohio State University for "Atom Smashing", and pointed out that by means of the cyclotron it is possible to form isotopes of the various elements, some of which should prove to be very valuable in medicine, chemistry, metallurgy and other of the scientific fields.

Professor Pool mentioned a number of elements which have been made radio-active by means of "cyclotronic atom smashing" and discussed their application in science. Several points in the talk were illustrated by slides and charts.

The coffee talker, John N. Reed, former football coach at Canton McKinley High School, discussed the Canton-Massillon football game and showed moving pictures of the various plays.

N.W. Pa. Chapter Gives Course on Modern Steels

By George S. DeArment
Asst. Plant Mgr., Champion DeArment Tool Co.

A series of ten educational lectures on the subject "Modern Steels" was announced by Roland Poux, chairman of the Lecture Committee of the Northwestern Pennsylvania Chapter at the December meeting.

The course will be presented by Dr. Cavelti, professor of chemistry at Allegheny College. It is being held at the College during the months of January and February.

Mr. Poux then introduced Mr. Evans, the vice-chairman, who announced that a lecture series would be given in Titusville on "Metals—How They Behave in Service." These lectures are to be presented by experts on the particular metal under consideration.

Practical Value Of 'S' Curves Is Emphasized

By Jack I. Medoff
Physical Metallurgist, Worthington Pump Co.

New York Chapter—The Greeks may have a word for it, but judging from the enthusiastic reception of the lecture on "Direct Hardening" presented by Dr. Janet Z. Briggs, assistant metallurgist, Crucible Steel Co. of America, on Nov. 12, those present had a few of their own that quite adequately reflected their approval.

The lecture was originally scheduled for presentation by Lewis S. Bergen, associate director of metallurgy and research, Crucible Steel Co. of America, as the first lecture of the educational series on "Heat Treatment of Steel", but a last minute substitution was necessitated by Mr. Bergen's illness. Despite the extremely short notice, Miss Briggs, one of the few women metallurgists in the country and a very attractive young lady, turned out to be an able pinch-hitter.

The talk dealt essentially with the hardening phenomenon as shown by the "S" curve of the austenite transformation.

Stressing the value of these curves to the practical steel hardener, Miss Briggs strongly recommended their close study for a better understanding of what takes place when any particular steel is hardened.

Reference was made to a paper by Grange and Kiefer of U. S. Steel Corp. Research Laboratories presented at the 1940 Annual Convention in Cleveland. Using S.A.E. 4340 steel, they constructed an experimental cooling transformation diagram analogous to the isothermal diagram, and offered a simple, empirical method for estimating cooling transformation phenomena from isothermal data.

They found excellent agreement for S.A.E. 4340 between the derived cooling curve and the cooling curve determined experimentally. Thus, when the isothermal diagram is known, this empirical method may be used to reveal the results for any known cooling rate.

Led by Technical Chairman A. B. Kinzel, chief metallurgist, Union Carbide and Carbon Co., the lively discussion often involved the speaker, chairman and audience in a three-cornered debate.

Committee 6-Footers Serve York Chapter Oyster Bake

By Albert J. Kleiner
Foreman, Hamilton Watch Co.

York Chapter held its annual Oyster Bake at Bierman's on Saturday afternoon, Dec. 7. Charlie Feiser, entertainment chairman, and his committee set up a grand afternoon of entertainment, food and refreshments.

Oysters were consumed on the half shell and steamed, topped off with celery, pickles, olives, pretzels, etc. Service by the committee was something worth seeing, especially 6½-footers like Bill Allen and Charlie Feiser in little white aprons slinging hash like professionals.

Between helpings, the boys amused themselves by playing cards, trying to beat the one-armed bandits, and enjoying good fellowship generally.

At four o'clock, the entertainment feature went on in the form of U. S. Steel's new technicolor film "Steel, Man's Servant".

Thus a fine afternoon of fellowship, gastronomic satisfaction, and intellectual entertainment was completed with a resolution to have more of these informal get-togethers in the future.

Still Ravin'

About New Jersey Chapter's Annual Smoker

By Fred P. Peters
Assistant Editor, Metals & Alloys

(Any resemblance between this contribution and some previously published verse by one Edgar Allan Poe is impurely coincidental.)

Ah, distinctly I remember it was in the bleak December
When in Newark guest and member gathered as in years before,
To forget (until the morrow) each his metallurgic sorrow
Grimly set to beg or borrow unconcern with case or core—
For one night to spurn all thoughts of softened case or brittle core—
This they sought, and nothing more.

Seated in the hall eight hundred of New Jersey's finest thundered
Forth applause and never wondered: Could this smoker be a bore?
Never doubt assailed their pleasure, not one frown reduced the measure
Of their joy at food and treasure (prizes they received galore!)
Just to sup and sip and hope for prizes handed-out galore.
This they wished—and nothing more.

But "enough" is not a pretty word to Hults and his committee
Who'd ransacked the entire city for the show that took the floor:
Songs there were, a joke dispenser, girls that shied from garments denser
(Here ten words removed by censor)—Who their antics could ignore?
No, not even *metallurgists* could their hot-roll strips ignore—
Shades of Sorby, Nevermore!

"Forging for Peace or War" Is Title of Naujoks' Talk

By Anthony C. Kowalski
Metallographer, Wyman-Gordon Co.

Worcester Chapter was privileged to hear Waldemar Naujoks, author of the Forging Handbook, published by the A.S.M., on "Forging for Peace or War" at the meeting on Jan. 8.

Mr. Naujoks was introduced by Paul Pfau, technical chairman of the evening. The speaker related a brief history of the making of forgings and presented slides of complicated forgings illustrating the ingenuity of the forging engineers. An interesting discussion period followed the lecture.

The Wyman-Gordon Co., St. Pierre Chain Corp., and Cape Ann Tool Co., were well represented at the meeting.

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Mysteries of Modern Oil Refining Unfolded At Calumet Meeting

By H. R. Boatman
Metallurgist, Inland Steel Co.

Calumet Chapter—Johann Krawetz, founder and president of the Phoenix Chemical Laboratory, Inc., as guest speaker for the meeting held Nov. 19 at the Woodmar Country Club, gave a clear and able presentation of the subject, "Modern Oil Refining".

In his opening remarks, Dr. Krawetz touched upon the origin and accumulation of petroleum deposits. He offered as a theory on the origin of petroleum, the selective decomposition of marine micro-organisms by bacteria; the products of this decomposition, and that of vegetable life, are accumulated in porous layer reservoirs, surrounded on all sides by pervious strata.

An interesting point brought up in the data on world distribution of petroleum was the fact that the production of the Illinois oil fields alone exceeds that of Rumania.

The speaker stressed the importance of time, temperature, and pressure regulation in modern oil refining, and explained the intricacies of modern cracking methods, polymerization and alkalation.

According to Dr. Krawetz, it is possible that, should necessity require it, synthetic rubber could be produced by the petroleum industry, in sufficient quantities to meet all consumption requirements in the United States.

Sustaining Members And Officers Honored

By K. Siems
Sales Engineer, Cincinnati Milling Machine Co.

Cincinnati Chapter, maintaining a tradition, again dedicated the December meeting to its sustaining member companies and the National Officers of the Society, namely, President Oscar E. Harder, and Secretary Bill Eisenman.

Dinner was served in the seasonably decorated Grill Room of the Alms Hotel, after which Bill Eisenman discussed bulls (on his farm), described views showing the "National Home" and reported on the activities and progress made by the Society as a whole.

Dr. Harder then spoke on "Physical Metallurgy of Bearing Metals" and ended his lecture with a "postscript" that came probably as a surprise to many of those in attendance who had never heard of his prowess in deep-sea fishing.

Valuable and very much appreciated door prizes and souvenirs were made possible through the courtesy of Central Steel & Wire Co., Columbia Tool Steel Co., Crucible Steel Co., Frederick Steel Co., E. F. Houghton & Co., Standard Oil Co. of Ohio, Queen City Supply Co., and Cincinnati Chapter A.S.M.

Drawing of Shells, Tubes Stainless Embossing Seen

By James C. Erickson

Tri-City Chapter—V. R. Parker of E. W. Bliss Co., Brooklyn, N. Y., addressed 125 members and guests at the Dec. 10th meeting, held at Rock Island, Ill., with an illustrated talk entitled "Plastic Working of Metals". The speaker substituted for E. V. Crane of the same company who was unable to attend the meeting.

Mr. Parker's discussion of the drawing of shells and tubes, and embossing of stainless steel was illustrated by films and lantern slides.

The operation of ingeniously designed presses, as well as can-making machines, which are capable of producing 300 vegetable and fruit cans per minute, was discussed.

The 50 members and guests attending the dinner which preceded the meeting were entertained by a coffee talk entitled "Amusing Shop Incidents" given by H. B. Rose of the Farmall Works, International Harvester Co.

Sixteen Billion Tin Cans Were Made in 1939

By H. R. Boatman
Metallurgist, Inland Steel Co.

Calumet Chapter—The meeting held on Dec. 17 was notable for two reasons: The presentation of certificates to the past chairmen of the Chapter, and H. S. Van Vleet, himself a past chairman of the Chicago Chapter, as guest speaker.

Present Chairman C. E. Chapman gave a brief history of the local Chapter and presented engraved certificates to Mr. Wishart of 1938, Mr. McMullan of 1939, and Mr. Sutherland of 1940, in recognition of their service to the Chapter.

Dr. Van Vleet, metallurgical supervisor, American Can Co., spoke on "Protective Coatings on Steel With Particular Reference to Properties of Tinplate for Food Containers".

He quoted some startling statistics concerning tin container production for 1939; namely that 2,561,000 net tons of steel were used in producing 15 to 16 billion "tin cans". Sixty per cent of these were used for food containers, 40% for general line containers.

In 1936 only 23% of the tinplate for containers was cold reduced, while in 1939 this amount was increased to 76%.

The speaker listed the following advantages of cold reduced plate for tin containers: *(a)* Mechanical improvement, *(b)* greater uniformity, *(c)* increased corrosion resistance, *(d)* appearance, and *(e)* continuity of tin coating.

Best Steel Base Analysis

The next point stressed was the effect of steel base analysis on container life. Graphs showed that high silicon, high phosphorus plate is inferior to low silicon, low phosphorus plate from the standpoint of service failures.

Copper in excess of 0.06% has the same effect as high silicon or high phosphorus for some products in enamel lined cans, whereas in other instances the service life is improved by the presence of copper. The detrimental effects of copper usually appear more serious than its benefits.

Many factors in steel and tinplate manufacture were discussed in connection with their influence on the performance of tinplate in can making. Among these factors were segregation in the steel ingot, annealing and temper rolling practice.

Adequate structural strength of the containers to resist processing and subsequent handling during shipping and merchandising is provided by a combination of steel chemistry and temper rolling practice.

For food products requiring a high temperature process, the container must have an adequate resistance to internal pressure or buckling resistance. On the other hand, food products closed at a high temperature followed by processing at boiling water temperatures require adequate resistance to internal vacuum or paneling resistance.

L.A. to Give Testing Course

Arrangements have been completed by the Los Angeles Chapter for an educational course on "Testing of Materials" to be given by Dr. D. S. Clark of California Institute of Technology. The course starts Monday evening, Jan. 27, and will continue for eight weeks.

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Foley Given Medal

F. B. Foley (Left) Receives a Past Trustee's Medal From President Harder at Philadelphia Officers' Night

President, Secretary Go to Philadelphia

By Joseph Missimer
Salesman, L. Norris Hall, Inc.

Philadelphia Chapter played host to Dr. Oscar E. Harder and William H. (Bill) Eisenman, president and secretary respectively of the A.S.M., at its annual "National Officers Night."

Bill Eisenman gave one of his inimitable coffee talks—"Stuff—Some Sense, and ?". Pictures of the new national office building were shown.

Dr. Ralph W. E. Leiter, chairman of the Program Committee, introduced Dr. Harder, who spoke on—"Physical Metallurgy of Bearing Metals". An open discussion at the close of the lecture included some remarks by Past Chairman Norman L. Mochel, who spoke on the importance of correct design, and the use of the proper lubricant in the life and service of bearing metals.

Both Dr. Harder and Mr. Eisenman gave a hint as to the proposed Sauveur Memorial Room to be established in the new Cleveland headquarters.

Joseph G. Jackson, reporting on the four phases of the Chapter's educational activities, stated that some 1300 people will have participated in this program during the year.

A well-attended Christmas Party was the business of the evening on Dec. 13, with plenty of good fellowship and entertainment for everyone.

Hardenability Talk Leaves Nothing to Imagination

By E. J. McKnight
Time Keeper, Griffin Wheel Co.

Rocky Mountain Group—"Hardenability" was the subject of Dr. M. A. Grossmann, director of research, Carnegie-Illinois Steel Corp., at the December meeting.

Dr. Grossmann's talk was profusely illustrated with diagrams that left nothing to the imagination, and while the lecture was of special benefit to heat treaters, the clear, understandable way in which it was delivered made it of interest to everyone.

P. A. Nelson of Wright & McGill, manufacturers of fishing equipment, delivered a coffee talk on the manufacture of fish hooks, which included photographs of ancient fish hooks made of bone, copper, wood and other materials.

Today, over 20,000 different fish hooks are made and an endless variety of flies. Materials for flies are imported from all corners of the world and, in Mr. Nelson's words "are made more for the fishermen than they are for the fish".

Powder Metallurgy Expected to Emulate Remarkable Expansion of Die Casting

By Fred P. Peters
Assistant Editor, Metals & Alloys

New Jersey Chapter on Nov. 18 listened in awe-struck wonder while a self-styled "peddler"—E. S. Patch, sales manager of Moraine Products Div., General Motors Corp., Dayton, Ohio—blandly recounted the limitations of his own product. However, the speaker did go beyond his nominal subject, "The Commercial Limitations of Powder Metallurgy", and succeeded in transmitting to the hall-filling audience much of his overflowing enthusiasm for the potential industrial utility of powder metallurgy.

Applications Are Broadening

Powder metallurgy's surprisingly long history has been characterized by its application to products that are impossible to make by melting and casting—tungsten filaments, porous self-lubricating bearings, cemented carbide tools, electrical contacts. Only recently has powder-processing been employed for making parts and products that can be and ordinarily would be made by conventional methods—spur gears, Alnico magnets, door-hinge bushings.

Today, Mr. Patch believes, powder metallurgy stands where die casting stood 20 years ago, at the beginning of a period of expanding application for the manufacture of *things* in competition with other fabricating processes. Developments along these lines will accelerate as industry learns to "design for powder metallurgy", just as it has profitably learned to design for die castings and for plastics.

Materials, men and machines are the most potent limiting factors today: *Materials*, because a high-quality, inexpensive iron powder is absolutely essential to any large scale use of powder compacts in competition with other metal-forms; *men*, because there are altogether too few design engineers in industry who know enough about the design factors in pressing and sintering to give powder metallurgy more than a passing thought; and *machines*, because stronger compacts of greater design flexibility must await the development of bigger and more versatile pressing equipment.

Mr. Patch scrutinized both the limitations and advantages of powder metallurgy fabrication from the production cost standpoint. For example, if the basic design of a part is such that the ratio of finishing cost to material cost is high, casting and machining is likely to give way to pressing and sintering.

Small Gears Made of Powdered Iron

Over half the cost of small screw-machined spur gears is represented by stock that is scrapped and labor and power expended in the machining operations, which are unnecessary on the pressed and sintered gear. Even with iron powder still priced as high as 10¢ a lb., the net material cost alone for a powder metallurgy oil pump gear is less than for a cast iron gear.

Designers should know that if high strength is desired, powder fabrication is as yet unsatisfactory, unless one can afford much higher briquetting pressures than are customary.

In powder practice the difficulty in meeting axial tolerances is greater than satisfying diametrical specifications. Re-entrant angles, of course, cannot be pressed in, and cross holes, too, must be made by subsequent machining operations.

Pressing die costs and, when some machining is necessary, cutting tool costs are high. On the other hand, large machining cost savings often offset tool and die costs, particularly in large quantity production.

Quantity Work Shows Savings

And it is in large quantity work that powder metallurgy's unspent silver dollars shine. Believe it or not, a bronze hinge bushing (of which 120,000,000 are now in use) can be fabricated at a lower cost per thousand by pressing and sintering powders than by manufacturing from strip in eyelet machines.

Achievements like this can be repeated countless times, Mr. Patch insists, if industrial manufacturers will develop and train men to design for powder metallurgy, as well as for the other and more familiar fabricating processes.

"Men" here is used in the generic rather than the specific sense, for Frances Clark, able metallurgess of Western Union Telegraph Co. and a powder metallurgy expert in her own right, upheld the distaff side not only in discussion of Mr. Patch's paper, but in drawing the winning number for the monthly door prize—of all things, a lady's manicure set!

Human Relations Stressed

By Warren H. Williams
Student, Penn State College

Penn State Group—W. L. Cook, personnel division of Carnegie-Illinois Steel Corp., Pittsburgh, spoke on Dec. 18 on "Human Relations in Industry".

Several points which he emphasized were that men are more important to industry than anything else; proper candidates should be selected for the proper situation; chances of advancement should be a decisive factor.

After Mr. Cook's talk, the Chapter held its annual Christmas program. Al Rose, a student member, acting as Dr. I. Q., rewarded correct answers to quiz questions with a package of cigarettes and incorrect answers with a cigar.

d'Arcambal Gets Hen —British Get Relief

By J. T. Ballard
Salesman, Quaker Chemical Products Corp.

Hartford Chapter was visited by Santa Claus the second week in December. Dave O'Neil, husky Hartford chairman, donned the bright red clothes and did the honors at Hartford's first "members only" Christmas Party, held at Rockledge Country Club.

The evening started with a few rounds of Bingo. The real fun started half way through the game when d'Arcambal, well known small-tool man, of Pratt & Whitney Co., won his prize—a hen, a live, cackling, mad hen.

But d'Arc wormed his way out. He started a raffle "for British War Relief"—and darned if he wasn't high bidder and won it again. So, undaunted, he started another raffle.

Ray Morris won the hen on this raffle only to raffle it again—with a final net pot of $46 which was duly paid over to the Relief.

Activities were then suspended in favor of a fine Smorgasbord and the evening ended with a snappy entertainment headed by a personable young lady who played excellent music with pitched cow bells.

High light of the entertainment was an octet made up of eight of the boys headed, no less, by d'Arc, who played some tunes on these cowbells under the close supervision of this same bright young lady. This performance brought pennies, nickels and dimes rolling to the floor in front of them to be added to the Relief donation.

Stainlessness Is Attributed to Oxide Layer

By C. A. Nagler
Instructor, University of Minnesota

North West Chapter—The subject of "Stainless Steels" was divided into three major headings by V. N. Krivobok, associate director of research for the Allegheny Ludlum Steel Corp., Brackenridge, Pa., speaking at the November meeting.

These were: Resistance to corrosion and oxidation; mechanical properties; adaptability to engineering structures.

The question as to what makes stainless steel stainless is still debatable; no theory presented thus far has been accepted universally. The most acceptable theory to date attributes stainless qualities to the infinitesimal oxide layer which renders the surface impermeable and still allows the material to retain its brightness.

In his talk the speaker chose to explain the stainless properties of steel on the basis of the film formation theory. There is no alloy of any composition that is perfectly "stainless" under all conditions; stainless properties of the material depend on its environment.

Pinhole attack can be successfully resisted if molybdenum is added to the basic stainless composition. This type of corrosion is evident in solutions containing the chloride ions, fatty acids, and similar substances.

Any number of solutions may be used to render the surface of a stainless alloy passive. Only two will be mentioned here—a 5 to 10% nitric acid solution, and a solution of hydrofluoric and chromic acids. The success of the passivating treatment depends on the proper length of time in the passivating agent, selection of the proper acid, and the proper preparation of the surface.

Under the second and third headings, it was noted that the proper evaluation of alloy additions to stainless steel will result in either maximum hardness or softness. Speaking of ductility and formability, the speaker emphasized the matter of distribution of elongation, which is a function of analysis; many examples were brought up to show how misleading measurements of "elongation in 2 in." can be.

Some of the questions brought up in discussion were in regard to the welding of stainless steel, fabrication difficulties at the mill, possible explanation for the addition of molybdenum to prevent pinholes, formation of pinholes in stainless cooking utensils, and the oxidation and intergranular attack of stainless alloys.

The meeting was attended by over 100 members and guests—the largest attendance to date for the 1940-41 season.

Rhode Island Officers Give Broadcast

M. W. Rigdon (Left), Vice-Chairman of Rhode Island Chapter and Manager of the Providence Branch, Crucible Steel Co. of America; Neil B. MacLaren, Chapter Chairman and Experimental Engineer at Brown & Sharpe Mfg. Co.; and Robert Engles, Announcer, Cooperate in Presenting a Radio Talk on "Progress of Metals During 1940" Over Station WEAN in Providence, R. I., on Jan. 6. (Photographed by Norman W. Saunders, 14-year-old son of REVIEW *Reporter Walter M. Saunders, Jr., analytical and consulting chemist.)*

Hydrogen Can Cause Metal Coating Defects

By Philip C. Rosenthal
University of Wisconsin

Milwaukee Chapter — The regular December meeting was set aside as the concluding and principal lecture of the educational series, which stressed "Surface Treatments" as its theme.

Carl A. Zapffe, research metallurgist at Battelle Memorial Institute was a happy choice as speaker, inasmuch as he had chosen "Hydrogen in Steel and Cast Iron, and Defects in Applied Coatings" as his topic.

Emphasizing his points with numerous illustrative slides, Dr. Zapffe explained how hydrogen can cause the grief that it does because of its decidedly individualistic behavior in steel and cast iron. This behavior includes not only a low solubility in the solid state, particularly in alpha iron, but also a relative ease of diffusion as atomic hydrogen with practically no chance for diffusion when in the molecular form.

Changes From Atomic to Molecular

Whenever hydrogen has a chance to precipitate out in the metal, it changes from the atomic to the molecular state, thereby preventing rediffusion. This precipitated hydrogen can build up enormous pressures even though present in very low quantities initially.

Many of the cracks and other defects in steel, cast iron and applied coatings on these metals can be attributed to this action of hydrogen.

When steel is pickled, the chances for hydrogen defects are increased because the pickling produces atomic hydrogen which diffuses readily into the metal. Some alloying elements cause an increase in absorption of hydrogen, and it has been found that carbon tends to retain it.

Coffee Talk on Skeet Shooting

The coffee talker, Dr. Victor A. Reinders, professor of chemistry at the University of Wisconsin Milwaukee Extension, told of his experiences as a champion skeet shooter.

The weekly educational lectures that preceded Dr. Zapffe's concluding talk covered the following subjects:

Hot Dip Coatings, by John R. Daesen, consulting metallurgist.

Protective Coatings (Paints and Lacquers), by P. H. Wiegand, research engineer in the paint division of the Pittsburgh Plate Glass Co.

What the Metallurgist Should Know About Plating, by P. J. Ritzenthaler, electrochemist, Cutler-Hammer, Inc.

Principles of Carburization, by Dr. R. A. Ragatz, professor of chemical engineering at the University of Wisconsin.

Porcelain Enamel for Corrosion Problems, by W. W. Higgens, director of ceramics at A. O. Smith Corp.

Malleable Talk Covers Methods, Kinds, Annealing

(Continued from page 1)

the chemical constituents. After the heating and melting phases are complete the slag is usually removed, the metal is stirred, superheated to about 2800° F., and held until uniform.

Sulphur and phosphorus must be kept low and the manganese balanced or annealing will be difficult or impossible. The castings as poured are very brittle.

They are packed in pots with mill scale or sand or a mixture of the two, primarily to keep their form under heat, but partly also to reduce the effect of the atmosphere in decarburizing or even oxidizing the surface. Radiant tubes and gas generators for producing suitable atmospheres are found to give excellent results in controlling this.

Review Career of Dean of Metallurgists

Michigan College of Mining & Technology Group held a banquet on Wednesday evening, Dec. 11, in honor of the late Dr. Albert Sauveur, the father of physical metallurgy.

After the dinner, which was attended by about 60 A.S.M. members and members of the faculty of the metallurgy department, Chairman Norman Kates introduced J. Gordon Donleavy, master of ceremonies for the evening, who in turn introduced Robert Steveling. Mr. Steveling presented a biography of Dr. Sauveur, covering his experiences, accomplishments and the honors he received during his career.

Called the "dean of American metallurgists", Dr. Sauveur pioneered the metallographic examination of metals and alloys, and his theories and explanations of experimental data have been the basis for a great amount of research and a foundation for many more theories.

Edwin Shifrin read passages from Dr. Sauveur's "Metallurgical Reminiscences" illustrating the natural wit and humor characteristic of the man.

Following the talks the Group was entertained by violin selections and group singing.

New Jersey Completes Course of Four Lectures On Practical Metallurgy

By Fred P. Peters
Assistant Editor, Metals & Alloys

New Jersey Chapter—Continuing its climb toward whatever pinnacle of learning hard-working A. S. M. chapters aspire to, New Jersey recently completed a highly successful fall educational course, consisting of four lectures by John W. Queen, Jr., manager, Alloy Steels Div., Jos. T. Ryerson & Son, Inc., Jersey City, N. J.

The course, entitled "An Introduction to Practical Metallurgy", presented clearly and simply the elements of steel manufacture, working, properties, testing, heat treatment and alloying. The oral lectures were supplemented with motion picture films on "The Making and Shaping of Steel", "The Manufacture of Tool Steel" and "The Making of Alloy Steel".

A special feature that will lend permanence to this course was the preparation and distribution to all members of a 32-page booklet concisely summarizing the contents of the four lectures.

This individual touch was only one of the many evidences of able organization and presentation, for which Mr. Queen, Mr. S. Skowronski, of International Smelting & Refining Co., and the other members of the Chapter's Educational Committee are heartily to be congratulated.

Local Talent Attacks Cold Work at Milwaukee

(Continued from page 1)

tomicrographs showing cracks developed by stress and corrosion.

Mr. Harvey's paper on the effect of cold working on fatigue was outlined by Professor Oesterle, chairman of the Milwaukee Chapter, in the absence of Mr. Harvey.

Starting with a steel cold worked to a maximum reduction of approximately 32%, he determined the fatigue properties on the original cold-worked samples, and on cold-worked and heat treated samples. His results led to the conclusion that cold rolling definitely increases fatigue strength.

Dr. Charles E. Brown, director of the Wisconsin Historical Museum, presented the coffee talk.

M.C.M.T. Group Honors Dr. Sauveur

Some of the 60 Student and Faculty Members at the Dec. 11th Banquet

Resistance Welding Was First Developed In 1886 by Thompson

By D. M. Horner
Control Dept., Harrisburg Steel Corp.

York Chapter on Dec. 11 heard E. I. Larsen of the P. R. Mallory Co., Indianapolis, on "Resistance Welding".

It was surprising to learn that this method of welding was first developed as early as 1886 by Dr. Elihu Thomson. This basic process was subdivided into its various fields, as follows:

Resistance butt welding, such as is used for welding two lengths of pipe.

Seam welding, where 12 ft. per min of sheet 0.030 to 0.040 in. thick is welded.

Flash welding, such as is used on specially built machines to weld up to 175 steel barrels per hr.

Spot welding and its many applications.

Projection welding, consisting of raising spot projections above the flat surfaces at the location of the weld by some method of fabrication prior to the welding operation.

Hydromatic welding, used for the fabrication of complete and complicated assemblies by using from three or four to several hundred electrodes to make as many welds simultaneously.

Gun welding, a variety of spot welding used especially for automobile body work requiring a specially designed portable welding gun for each operation, enabling the operator to reach places which would be relatively inaccessible otherwise.

Mr. Larsen also discussed the importance of correctly timing the current input in spot welding, both with regard to the number of cycles and the application of the current during the correct part of the cycle.

The selection of the best possible material for electrodes was discussed in considerable detail, with graphs showing useful electrode life for various materials under different conditions.

It is naturally desirable to use a material with the greatest possible electrical conductivity and still sufficiently strong at high temperatures to prevent excessive upsetting of the tip under service conditions.

Bethlehem Traces History Of Seattle Steel Industry

By E. F. Flohr
Sales Rep., Bethlehem Steel Co.

Puget Sound Chapter — A dinner meeting was held on Dec. 4 at the Seattle plant of Bethlehem Steel Co.

Harold E. Gray, manager of sales, gave a very interesting talk on the history of iron and steel manufacture in the Northwest. Starting with the beginnings of this industry in the days of the early settlers, he told of the formation of the Pacific Coast Steel Co. and events on down to the present time.

Products manufactured in the steel mills at Seattle were discussed, showing how they service industry in general in this territory.

E. Cocanower, chief inspector, then gave a brief talk on safety features in the Seattle plant.

After these discussions the group visited the various departments in the plant, and a great deal of interest was evidenced.

Oregon Replaces Its Secretary, Now at Fort Lewis for Year

By R. E. Neils
Design Engineer, U. S. Forest Service

Oregon Chapter—Among the members and guests present at the November meeting were Vice-Chairman Parks of the Golden Gate Chapter.

After dinner, Chairman Healy announced that the Chapter secretary, B. F. Sawyer, had resigned to report to Fort Lewis for one year of military service. At a meeting of the Executive Committee, R. E. Neils was elected to serve as secretary and treasurer until next May.

Harry S. Dorman, president of Knight Packing Co., gave a very good talk on "Mobilization of Industry", stressing the need for greater unity of industry and labor in the present day troubled world.

George M. Huck, metallurgist of Bethlehem Steel Co., then presented a paper on "Fatigue in Steels".

Mr. Huck named several common causes of fatigue failure, namely, machining scratches, sharp fillets and incorrect design. He also stressed the fact that cracks (whether external or internal) and corrosion promote fatigue in steels, and that this condition is less prevalent in mild steels than in alloy or harder steels.

After this very interesting paper, Vice-Chairman Thomas opened a discussion of the subject that brought out some very enlightening examples of fatigue conditions.

Metals and Plastics May Compete or Be Complementary

By George S. DeArment
Asst. Plant Mgr., Champion DeArment Tool Co.

Northwestern Pennsylvania Chapter held a meeting at the Lafayette Hotel in Meadville, on Nov. 14.

Vice-Chairman Charles T. Evans, Jr. introduced Dr. A. Allan Bates of Westinghouse Electric & Mfg. Co., the speaker for the meeting. Dr. Bates's subject was "Competition between Metallic and Non-Metallic Materials".

Dr. Bates broke his talk down into two parts—fields where plastics and metals compete directly and fields where plastics and metals are complementary. His purpose was to point out to men working in metals the adaptability of plastics to many types of products hitherto made entirely from metals and at the same time the new uses of metals made possible by plastic products.

Dr. Bates opened his lecture by giving a brief history of the development and production of plastics. The first real development came in 1860 when Hyatt introduced celluloid. Then came the development of casein in 1890 and the first modern plastic, bakelite, in 1909.

In 1926 1,500,000 lb. of plastics was produced; by 1940 this has increased to an estimated production of 225,000,000 lb.

The lecturer classified plastics into industrial groups—the pure resins and the filled resins. He further subdivided the pure resins into synthetic resins, natural resins, cellulose, proteins, and elastomers.

Examples of these various types of plastics were presented in a manner that brought out very plainly the places where plastics are displacing metals and the fields where plastics have increased the use of metals.

In the discussion that followed the lecture Dr. Bates prophesied that in the next few years plastics in connection with housing would grow tremendously. He exhibited examples of plastics in use as building materials, both structural and decorative.

Western Metal Congress and Exposition
Los Angeles, May 19 to 23, 1941

Certificates Awarded for Dayton Chapter Service

By James W. Poynter
Lab. Assistant, American Rolling Mill Co.

Dayton Chapter's December meeting was a combined National Officers' Night and Past Chairmen's Night.

National President Harder awarded certificates for excellent service to Past Chairmen Oswald, Kennedy, Grinell, Meacham, Duke, Long, Morris, Koehring, Fuller, Webber, Cole and Monnier. Past Chairmen Johnson and Oliver were unable to be present.

A special certificate was given Secretary (now Major) Fred Reiter who has served the Dayton Chapter faithfully and well for the past 12 years and has now been ordered to active duty with the Army. I. R. Rapp of the Dayton Power and Light Co. was appointed secretary by the Executive Committee to fill Major Reiter's place.

After a combined travelog and report on the state of the Society and its president's morals by National Secretary Eisenman, Dr. Harder delivered his address on "Physical Metallurgy".

M. R. Whitmore, chairman of the Educational Committee, announced that the educational course for the year, starting Jan. 15, would be based on H. D. Churchill's "Physical Testing of Metals".

Helpful Literature — Mail Coupon Below

Binocular Mike
Extremely wide field, long working distance, and stereoscopic vision are only a few of the advantages cited by Bausch & Lomb for the improved KW wide field binocular microscope. Price list and description of accessories included. Bulletin La-35.

Thermocouple Insulators
An exceedingly complete stock of thermocouple insulators is described in a bulletin made available by the Claud S. Gordon Co. Bulletin Hc-53.

Pyrometers
An impressive 32-page booklet showing the "Celetray" line of photocell, electric, light ray pyrometers has just been published by C. J. Tagliabue Mfg. Co. Bulletin Ae-62.

Potentiometer Controllers
Designed for applications requiring the utmost accuracy and sensitivity in temperature control, a complete line of potentiometer controllers is described in literature made available by Wheelco Instruments Co. Bulletin Ae-110.

Portable Brinell
Brinell hardness of metals can be obtained quickly anywhere—without dismantling and without transporting specimens to the laboratory—by a portable Brinell tester described in a folder by Teleweld, Inc. Bulletin Hd-98.

Machinery Steel Selector
A handy chart giving complete physical characteristics with variations up to 8" cross-sections, machining data, etc., on the ELASTUF group of Related Machinery Steels is available through Horace T. Potts Co., Brown-Wales Co., and Beal McCarthy & Rogers. Bulletin Ed-264.

High Speed Steels
Rex High Speed Tool Bits and Rex High Speed Steels are interesting developments which are described in new literature published by the Crucible Steel Co. of America. Bulletin Ae-56.

Trantinyl
"Ten times the wear"—"Turn after turn untouched"—"Unbelievable tonnage and low scrap"—are a few of the comments by users of Trantinyl alloy guides. The answer is the right choice of over 22 alloy steel analyses plus correct processing and heat treating by Youngstown Alloy Casting Corporation. Operating men should investigate this amazing alloy now. Bulletin Kd-291.

Steel Data
Ten colorful leaflets each describing a popular grade of tool or high speed steel and giving useful data, application information, etc., have just been issued by Vanadium-Alloys Steel Co. Write for Bulletin Kd-29.

Ground Shafting
A colorful folder describing Ground Shafting made by Bliss & Laughlin, Inc., is now available through this company. Pictures steps in shafting production. Bulletin Bc-42.

Electric Furnace Units
A sturdy 8½x11" folder describing the Sargeant & Wilbur line of Electric Furnace Units for Bright Annealing, Brazing, and Soldering is now available. Bulletin Ic-275.

Salt Bath Furnace
"As modern as radio-beam control" says the attractive folder put out by Commerce Pattern Foundry & Machine Co. about the Upton electric salt bath furnace. A brief but informative article on "The Importance of Temperature" by R. C. Upton is included. Bulletin Ed-266.

Electric Salt Baths
Literature is available from Bellis Heat Treating Co. describing electrically heated bath furnaces which are economical to operate and have a wide range of applications in hardening, annealing and heat treatment of high speed steel, stainless steel, nickel, aluminum, copper and bronze, etc. Bulletin Ny-48.

Insulating Firebrick
A new bulletin on Insulating Firebrick covering their application to boiler and industrial furnaces has been issued by the Babcock & Wilcox Co. Bulletin Ae-75.

Magnefer
The reasons why "Magnefer" is more than "just another" clinkered dolomite are presented in an attractive folder by Basic Dolomite, Inc. Bulletin Ae-192.

Hi-Speed Furnace
An essential unit for general machine and tool shops is the Hi-Speed Steels Furnace described in literature by Johnson Gas Appliance Co. Bulletin Ae-298.

Industrial Furnaces
A series of interesting bulletins showing Dempsey Industrial Furnaces in a wide range of requirements is now available through the Dempsey Industrial Furnace Corp. Bulletin Dd-260.

Heat Treating Furnaces
A brand new 16-page booklet of Holcroft & Company shows and describes their line of controlled atmosphere heat treating furnaces. Bulletin Ec-203.

High Temperature Combustion Furnaces
Single and double tube laboratory furnaces, provided with Globar elements producing temperatures up to 2500° F., are described in a bulletin of Burrell Technical Supply Co. Bulletin Ec-213.

Hardening Furnace
A pamphlet which describes "Certain Curtain" furnaces made by C. I. Hayes, Inc., will be particularly interesting to those with hardening problems. Bulletin Nc-15.

Heroult Furnace
Revised and expanded to include modern major innovations in the construction and operation of the Heroult electric furnace, the latest edition of the American Bridge Co.'s Heroult Electric Furnace Bulletin is available. Bulletin Bb-124.

Enameling Iron Sheets
A highly refined pure iron product, Inland Enameling Iron Sheets, is described through interesting photographs and technical text in an attractive 8-page booklet just released by Inland Steel Co. Bulletin Ld-295.

Industrial Baskets
A handbook for shop executives and purchasing agents showing 50 types of construction and design of welded industrial baskets has been printed by Rolock, Inc. Bulletin Ae-299.

Heat Treating
A folder by Industrial Heating Equipment Co. explains and illustrates diagrammatically a continuous type heat treating furnace in which temperature can be held to within extremely close limits, and in which the product is always uniformly heated. Bulletin Ga-168.

Carburizing Baths
Seven types of carburizing baths for treating steel at temperatures ranging from 1200° F. to 1750° F. are introduced in a new folder by A. F. Holden Co. Bulletin Ae-55.

Carburizer Cleaner
A machine for cleaning used carburizer so as to increase its life 50% is illustrated and described in a booklet by The Thurner Engineering Co. Bulletin Ae-300.

Liquid Carburizer
A rapid, uniform, controllable method of carburizing in a liquid bath is described in a new 32-page booklet issued by E. F. Houghton & Co. Bulletin Ae-38.

Case Hardening
The Pioneer two-component carburizing bath-Aerocase manufactured by the American Cyanamid & Chemical Corp. is described in detail in a two-color folder just released. Bulletin Kd-148.

Valcase
Chapman Valve Co. has a fused salt bath mixture known as Valcase which forms a perfectly balanced and economical carburizing bath. A folder gives instructions for handling and use and typical results obtained. Bulletin Na-80.

No Decarburization
A low cost method of hardening and annealing under production conditions with no decarburization is described in technical data available through Westinghouse Electric & Mfg. Co. Bulletin Fd-134.

Rapid Oil Cooler
New leaflet by Bell and Gossett shows the importance of keeping the oil quenching bath at a constant temperature in the heat treatment of metals, and describes the new B & G Oil-Cooler. Bulletin Kd-287.

Boxes and Trays
Standard Alloy Co. offers all those advantages which spring from long specialization in heat and corrosion resisting alloy castings for such things as boxes and trays. An abundance of proven data is contained in Bulletin Oy-151.

Heat and Corrosion
A new catalog showing various uses of Fahrite to resist heat and corrosion has been prepared by the Ohio Steel Foundry Co. Bulletin Kd-40.

Refinery Alloys
Special alloys for refineries, corrosion, temperature, and abrasion resisting are covered in a colorful folder produced by the Duraloy Co. Bulletin Kd-233.

Ampco-Weld
A coated, Aluminum-Bronze electrode with the properties of Ampco Metal will be interesting to those using welded fabrication. Described in a colorful booklet by Ampco Metal, Inc. Bulletin Ae-175.

Brazing Alloys
How you can put your metal joining on a sound, economical basis is explained in a folder just released by Handy & Harman. Well illustrated and full of facts. Bulletin Ic-126.

Deposition Rate
A graph which helps you estimate accurately quantity of electrodes needed and welding time required . . . data on Cr and Cr-Ni alloy weld metal: types of service for each grade and recommended heat treatment . . . has just been released by the Arcos Corp. Bulletin Ld-191.

Contour Machining
A new Handbook on Contour Machining containing 158 pages of valuable metal working helps is being made available by Continental Machines, Inc. Bulletin Nd-170.

Band Saws
Actual performance records of DoALL Band Saws are contained in a booklet made available by the DoAll Co., Inc. Bulletin Ae-297.

Carbide Tools
"Firthite General Purpose Tools" is the title of a new bulletin and price list available from Firth-Sterling Steel Co. Bulletin Ae-177.

Forgings
Forgings for All Industries are described in a new booklet released by the Ajax Steel and Forge Company. Very helpful to all users of forgings. Bulletin Kb-200.

Cutting Oil
An informative booklet containing 48 pages of scientific applications for the largest selling sulphurized cutting oil is offered by D. A. Stuart Oil Co., Ltd. Bulletin Kd-118.

Cutting Oils
An interesting new booklet, "Metal Cutting Lubrication — In Theory and Practice", has just been made available by Cities Service Oil Co. Bulletin Ec-113.

Recorder-Controllers
Foxboro's new booklet describes the permanent precision, low maintenance and reductions in spare-parts inventories for Potentiometer Recorders and Recorder-Controllers. Bulletin Kd-21.

Optical Strain Gauge
The Tuckerman Optical Strain Gauge for measuring tension and compression strains as small as 0.000002 inch in various materials, structural parts and structures is described more completely than ever before in a bulletin made available by the American Instrument Co. Bulletin Nd-259.

Pyrometer Controllers
A new catalog by the Brown Instrument Co. describes, in full detail, models and outstanding features of both electric and air-operated Brown Potentiometer Pyrometer Controllers. Bulletin Nd-3.

N-A-X
New twenty-page, fully illustrated booklet on N-A-X high tensile low alloy steel has just been published by Great Lakes Steel Corporation. This steel has been thoroughly proved in application where ordinary high tensile steels have failed. Bulletin Kd-229.

Special Steels
An impressive new 160-page Hand Book of Special Steels which gives the very latest data on the characteristics and applications of Allegheny Ludlum tool steels has just been printed. Write today since issue is limited. Bulletin Ic-92.

Free Machining Steels
Speed Case and Speed Treat, two steels with increased machining properties, are described in literature available through Monarch Steel Co. Bulletin Cd-255.

Steel Data Sheets
Wheelock, Lovejoy & Co. gives analyses, physical properties, heat treating instructions, and applications of Hy-Ten, Economo, and S.A.E. alloy steels in concise and easily usable form. Bulletin Ox-74.

Rustless Handbook
Offered as an answer to the question, "Which stainless steel?", a 60-page handbook by Rustless Iron and Steel Corp. gives complete information on properties, processing, and engineering applications of a wide variety of rustless and stainless steels. Excellently arranged and printed. Bulletin Bb-169.

Welded Stainless Tubes
A really striking 16-page booklet containing 45 illustrations on Welded Stainless Tubing is offered by the Carpenter Steel Co. Bulletin Kd-12.

"Aircraft Quality" Steels
The line of steels and steel products manufactured by Republic Steel Corporation is so diversified that the company has prepared a complete listing which is now available in one booklet. Bulletin Ic-8.

8-Steel Tool Kit
A compact set of 8 shop-proved tool steels that will handle 90 per cent of the jobs in any plant are outlined by The Bethlehem Steel Co. Bulletin Hd-76.

Industrial Furnaces
Furnaces of all types are fully described in technical bulletins made available by the Eclipse Fuel Engineering Co. Bulletin Hc-226.

Metal Heating
Improvements in furnace economies, operating conditions and appearance, furnaces that will more satisfactorily meet old requirements or handle new processes, service that will help solve the most stubborn problems are offered and described by Mahr Mfg. Co. in Bulletin Ea-5.

Model "Y"
The Sentry Model "Y" electric furnace, using the Sentry Diamond Block method of heat treatment, provides exceptional quality high speed steel hardening at minimum production cost. The furnace is described in Bulletin Oy-114.

Clean Hardening
Continuous clean hardening machines for work ranging from extremely small, light springs, stampings, drop forgings, etc., up to quite large and heavy pieces are described in a bulletin by the American Gas Furnace Co. Bulletin Ed-11.

Oil Burners
North American Mfg. Co. offers a bulletin describing improved low pressure oil burners, one type especially designed for automatic control and ideally suited for use with proportioning control valves. Bulletin Na-138.

Bright Annealing
Various types of electric and fuel-fired furnaces built by the Electric Furnace Co. for bright-annealing wire, tubing, strip and other products are described in an 8-page folder. Bulletin Lb-30.

Electric Furnaces
A new catalog on electric furnaces and pyrometers has been released by the Hoskins Manufacturing Company. For anyone who does any kind of heat-treating, brazing, or uses heat-resisting castings. Bulletin Hc-24.

Hardening Furnace
A new radiant tube vertical-type hardening furnace for hardening drop forged mechanics' tools without scale or decarburization is described and shown in Surface Combustion's new folder. Bulletin Kd-51.

Handling Heat
Alundum and Crystolon refractories meet all requirements for kiln linings and kiln furniture. An attractively laid out and illustrated folder gives the evidence. Norton Co. Bulletin Bb-88.

Super Refractories
A very handsome spiral-bound 76-page catalog covering their extensive line of refractories for heavy duty service is offered by the Carborundum Co. Bulletin Ld-57.

Electric Carburizer
Interesting features of their electric carburizer available in mass production quantities are contained in a colorful 20-page booklet just released by Hevi Duty Electric Co. Bulletin Ld-44.

Aircraft Heat Treating
A special bulletin "Heat Treating Furnaces for the Aircraft Industry" has just been prepared by the Lindberg Engineering Co. Bulletin Nd-66.

New Furnace Bulletin
Many ideas to help solve your furnace problems are contained in a new booklet by the Despatch Oven Co. Bulletin Nd-123.

New Electric Furnace
An electric furnace that is new in every respect . . . including new insulating refractory lining, increased wall insulation, simplified door lift mechanism . . . is described in a bulletin released by the American Electric Furnace Co. Bulletin Gd-2.

Electric Furnaces
A four-page bulletin on ⅛ lb. to 4 lb. high frequency melting furnaces and 3 kw. converter is now available through the Ajax Electrothermic Corp. Bulletin Dd-41.

Metal Descaling
A process which overcomes past descaling disadvantages through a new method which removes scale completely without the slightest damage to the work is introduced in a folder by the Bullard-Dunn Process Division of the Bullard Co. Bulletin Ld-143.

Tocco Process
The marvel of all heat treaters—the Tocco Process of Induction Hardening—is fully described in a colorful folder by the Ohio Crankshaft Co. Bulletin Lc-145.

X-Ray Inspected Castings
All types of heat and corrosion resistant castings made with extensive use of "X-Ray Inspection" and modern foundry methods are shown and described in a 16-page two-color booklet made available by the Electro-Alloys Co. Bulletin Ld-32.

The Review
7301 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature. (Circle the numbers that interest you. It is important to write in your company or business connection when you return this coupon.)

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Ed-264	Ny-48	Nc-15	Kd-148	Ic-126	Kd-229	Ed-11	Gd-2
Ae-56	Ae-75	Bb-124	Na-80	Ld-191	Ic-92	Na-138	Dd-41
		Ld-295	Fd-134	Nd-170	Cd-255	Lb-30	Ld-143
				Ae-297	Ox-74	Hc-24	Lc-145
				Ae-177	Bb-169	Kd-51	Ld-32
				Kb-200	Kd-12		

Magnaflux Theory Discussed; Particles Graded and Colored

By Francis T. McGuire
Teaching Fellow, University of Notre Dame

Notre Dame Chapter—F. B. Doane of the Magnaflux Corp. discussed the theory of the magnaflux test in terms clear enough for all to understand at the December meeting.

Surface and sub-surface discontinuities which lead to leakage fields were shown in slides. The direction of the magnetizing force and the leakage field were illustrated along with the deposited powder which makes the minute defects visible to the observer.

The effect of the depth of the defect was discussed with its relation to the width of the deposited powder. Generally the greater the distance from the surface the broader is the deposit.

The effects of particle concentration and magnetizing force were discussed along with the possible variation in sensitivity that can be achieved.

Pictures of industrial installations showed the many possible applications of this test. A new condenser discharge apparatus which is not as yet used industrially was explained.

Mr. Doane concluded his talk with a discussion of new magnetic particles whose size is carefully graded and which can be colored so as to make them more visible.

Los Angeles Has Dinner Dance as Christmas Fete

By R. Lowrey
Metallurgist, Hydril Co.

Los Angeles Chapter—The Clubhouse of the Riviera Country Club was the scene of an hilarious evening of dinner, entertainment and dancing attended by about 70 couples as a Christmas fete.

Entertainment, consisting of Mexican dancing, children's quartette, magicians and acrobatics, was followed by dancing into the wee hours to the music of Ted Miller's renowned orchestra.

W. W. Farrar, of Farrar Industrial Products Co., officiated as toastmaster and distributed door prizes, the winning numbers being drawn by Mrs. Richard S. Smith. (Mr. Smith is with the Cook Heat Treating Corp.)

Among the prizes was a compact in the form of the "eight ball" drawn, "accidentally" of course, by Mrs. Dick Smith. Now he is behind it!

Other prizes were drawn by Ray Imhoff of Axelson Mfg. Co., and Bill Weeks of Vultee Aircraft Co.

A marvelous evening was had by all and it is hoped this affair can be repeated in future years.

Tungsten Situation Not Acute, Discussion Reveals

By James B. Hess
Junior Metallurgist, J. H. Williams & Co.

Buffalo Chapter was fortunate in securing James P. Gill, past president, A.S.M., for speaker on Dec. 12. His discussion of the "Recent Developments in Tool Steels" has been reported in previous issues of THE REVIEW, but the interest in the subject was great as the unusually large attendance proved.

In the discussion that followed, Mr. Gill reported that concern for a continuing supply of tungsten as a strategic material in the national emergency need cause no great fear, as present national reserves and lower grade domestic sources exist in sufficient quantities to keep the situation from becoming acute.

HERE AND THERE WITH A.S.M. MEMBERS

CLEVELAND Chapter loses an active member and Electro-Alloys Co. loses a crack sales metallurgical engineer, with the appointment of HARRISON I. DIXON as assistant general manager of the Park Chemical Co., Detroit.

H. I. Dixon

Mr. Dixon has served as chairman of various A.S.M. Chapter committees, and has compiled a monumental history of the Cleveland Chapter and the National Society. He hopes to be active in the Detroit Chapter and have as much fun out of it as in serving other Chapters.

A mechanical engineering graduate from University of Michigan, he has done post-graduate work at Carnegie Tech. He has served as metallographist for General Motors Research Corp., assistant metallurgist at Crucible Steel Co.'s Park Works, field test engineer for New Jersey Zinc Corp., and has been with the Electro-Alloys for the past seven years as sales metallurgical engineer.

* * *

ERLE F. ROSS, since 1919 associated with the Penton Publishing Co., Cleveland, as a member of the editorial staff of *Steel* magazine and for the past three years engineering editor, has been made Chicago editor of Penton publications, including *Steel*, *Daily Metal Trade* and *The Foundry*.

E. F. Ross

Mr. Ross was an active member of the Cleveland Chapter for many years, serving as chairman in 1934-35.

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NEWLY appointed research director for the Lindberg Engineering Co. of Chicago is NORBERT K. KOEBEL, associated for the past 4½ years with the Eastman Kodak Co. as metallurgist.

N. K. Koebel

Previous to this he was at Battelle Memorial Institute where he conducted research on furnace atmospheres.

Koebel, a graduate of Ohio State University, carries degrees of Bachelor of Chemical Engineering, and Master of Science in Metallurgical Engineering.

Western Metal Congress and Exposition
Los Angeles, May 19 to 23, 1941

Bates Talks at Notre Dame

By Francis T. McGuire
Teaching Fellow, University of Notre Dame

Notre Dame Chapter—A large gathering of A.S.M. members and guests heard A. Allan Bates, manager of the chemical and metallurgical department, Westinghouse Electric & Mfg. Co., tell of the much-discussed conflict of "Metals Vs. Non-Metals in Industry" at the November meeting. Dr. Bates' talk is reported on another page.

Before the meeting a well-attended dinner was held in the University of Notre Dame Dining Hall.

You're in the Army Now!

FRED M. REITER, industrial gas engineer, Dayton Power & Light Co., secretary of the Dayton Chapter for the past 13 years—now a major, Chemical Warfare Service, appointed for 1 year's extended duty with the first quarter assignment at the Army Industrial College in Washington.

PAUL V. BOLLERMAN, on one year's leave of absence from Crucible Steel Co.'s research laboratory, and serving as 2nd lieutenant in the Ordnance Department at Aberdeen Proving Grounds.

GEORGE H. THURSTON, a chemist with Bethlehem Steel Co. in San Francisco—now 1st lieutenant with the 6th Coast Artillery, stationed at Fort Scott, San Francisco.

F. G. JENKINS, formerly with Eastman Kodak Co., Rochester—1st lieutenant in the Ordnance Department, ordered to active duty at Watertown Arsenal, as chief of the procurement section.

LT. F. X. BRADLEY, Jr,—involved in the organization and operation of the Air Corps Advanced Flying School at the newly organized Southeast Training Center in Montgomery, Ala.

D. F. RUNDLE, metallurgist, Centrifugal Fusing Co., Lansing, Mich.—on active duty with the 61st Coast Artillery at Fort Sheridan, Ill.

JIM ENG, on leave of absence from Halcomb Steel Division—called for active duty as 1st lieutenant in the Ordnance Department, stationed at Springfield Armory, Springfield, Mass., on metallurgical work.

ORVILLE T. BARNETT has joined the welding electrode department of Metal & Thermit Corp., New York, as engineer of tests.

O. T. Barnett

A graduate of Armour Institute of Technology in chemical engineering, Mr. Barnett has a well-rounded background in the metallurgy of welding. He was formerly associated with the Carnegie - Illinois Steel Corp. in the metallurgical control department, and later with Black, Sivalls & Bryson, Inc., of Oklahoma City, where he first did research and welding control work and was later placed in charge of shop inspection.

At Metal & Thermit, all electrode test work, including manufacturing control testing at both the Jersey City and the East Chicago plants, as well as research work on uses and applications of electrodes, will be under his supervision.

* * *

BRUCE W. DEACON, 57, for 11 years Detroit Manager for D. A. Stuart Oil Co., died Dec. 9 after an illness of several weeks.

As one of the oldest industrial oil salesmen in Detroit, "Deac", as he was popularly known, enjoyed the acquaintance, confidence and friendship of hundreds of Detroit factory and purchasing officials. Starting as a machinist and serving his apprenticeship, he became a tool maker, continuing in this profession until he entered the lubricating oil business in 1919.

Research in Nitriding Develops Hardness Tester

Michigan College of Mining and Technology Group held the second meeting of the year on Nov. 8. The feature attraction was an interesting talk on "Personal Research in Nitriding" by Don Clifton.

The talk consisted of Mr. Clifton's research on the nitriding of steels performed at Michigan Tech, the scope of which was to determine the actual chemical reactions involved.

A remarkable feature of the talk was a discussion of the scratch hardness tester developed by Mr. Clifton in the course of his research in order to determine the relative hardness of the nitride case of the tested specimens.

The specimen to be tested is scratched with a diamond point and the depth and width of the scratch will vary with the hardness of the material. The width is measured with a microscope, thereby giving relative hardness measurements.

Mr. Clifton showed pictures of the apparatus to supplement his talk and also a photomicrograph of a tested specimen showing the scratch made by the diamond point.

The business of the meeting consisted of preparation for "Sauveur Night" and the completion of plans for an inspection trip to an iron foundry in the vicinity of the college.

Metallurgists Needed for National Defense Work

The United States Civil Service Commission has announced that it will again receive applications for positions of metallurgist and metallurgical engineer, various grades, with salaries ranging from $5600 to $3200 a year.

Difficulty is being encountered in filling positions in the Bureau of Mines in connection with the national defense program for the development of strategic metals. Qualified persons are urged to send their applications to the Commission's Washington office at once where they will be rated as received until *Dec. 31, 1941.*

Applicants will not be given a written test. They will be rated on their education and experience. Maximum age limit is 60 years.

Further information regarding the examination and the proper application forms may be obtained from the Secretary of the Board of U. S. Civil Service Examiners at any first or second class post office, or from the United States Civil Service Commission, Washington, D. C.

POSITIONS OPEN

Address reply to Box No., care of A. S. M., 7301 Euclid Ave., Cleveland, O.

RECENT COLLEGE GRADUATE with knowledge of electricity or metallurgy or both to do experimental work. Write full particulars of training, age, salary expected, etc., to Box 1-5.

PLANT SUPERINTENDENT: Company manufacturing metallurgical products requires engineer experienced in installation and maintenance of equipment to operate a small, rapidly expanding, new plant. Box 1-10.

RECENT METALLURGICAL GRADUATE: Capable of working with photomicrographic equipment in making and analyzing resistance welds. Should have some background in electrical work to aid in experimental research on resistance welding and electrical control. Box 1-15.

TOOL STEEL METALLURGIST: To have supervision over all metallurgical work in connection with tool production. Opportunity to become plant metallurgist, supervising all metallurgical phases of the factory. Practical tool steel experience required. Salary $4-5000. Box 1-20.

CHEMIST-METALLURGIST: Training in physical chemistry, metallurgy and metallography; two to five years' experience. Research and development of new materials for steel treating. Vicinity of New York City. Box 1-25.

GRADUATE METALLURGIST well grounded in steel plate and open hearth experience. To be trained as welding engineer for important shipbuilding firm. No welding experience required. Professional minded type of man wanted. Excellent opportunity. Salary $4—5000. Box 1-30.

GRADUATE ENGINEERS: For sales work in New England, New York, Pennsylvania, New Jersey and Indiana territories. Experience preferred in heat treating, polishing and grinding operations. Box 1-35.

CHIEF METALLURGIST: Preferably under 50; degree in metallurgy required. At least five or ten years' experience in a supervisory capacity. Thorough knowledge of alloy steels, ferrous and non-ferrous metals, heat treatment, etc. To handle new eastern division of company manufacturing aircraft accessories, engine parts, instruments. Box 1-40.

Wanted

WELDING ENGINEER: Graduate metallurgist with experience in fabrication procedure and welding practice. State acceptable salary.

Address
Battelle Memorial Institute
Columbus, Ohio

List of A.S.M. Employment Offices

AKRON, OHIO
Merrill D. Wright
Central Vocational Bureau
203 Buckeye Bldg.

ATLANTA, GEORGIA
A. H. Benton
Personnel Service Co.
Mortgage Guarantee Bldg.

BALTIMORE, MARYLAND
H. C. Clodi
Personnel Service Co.
1005 Lexington Bldg.

BIRMINGHAM, ALABAMA
V. E. Love
Commercial Employment Bureau
1826 North Third Ave.

BUFFALO, NEW YORK
E. F. Dean
Dean Employment Service
Brisbane Bldg.

CHICAGO, ILLINOIS
James H. Lee
Consolidated Agencies, Inc.
209 South State Street

CINCINNATI, OHIO
E. A. Cost
Progressive Placement Service
306 Schmidt Bldg.

CLEVELAND, OHIO
T. G. Protheroe
Technical Placement Service
504 Swetland Bldg.

COLUMBUS, OHIO
Harry C. Vaughn
Harry C. Vaughn & Associates
36th Floor, A.I.U. Bldg.

DALLAS, TEXAS
C. K. Karr
Karr Employment Service
Republic Bank Bldg.

DAYTON, OHIO
Allen G. Banks
Banks-Mitchell Employment Service
304 Keith Bldg.

DENVER, COLORADO
B. L. Johnson
Business Men's Clearing House
Midland Savings Bldg.

DETROIT, MICHIGAN
George M. Millar
George M. Millar Employment Service
National Bank Bldg.

HARTFORD, CONNECTICUT
Emory L. Wolfe
Personnel Service Bureau, Inc.
720 Main Street

HOUSTON, TEXAS
Rodney Quinby
Quinby Employment Service
308 Bankers Mortgage Bldg.

INDIANAPOLIS, INDIANA
Ancil T. Brown
Brown Efficiency Bureau
806 Guaranty Bldg.

KANSAS CITY, MISSOURI
T. DeWitt Hughes
Western Employment Counselors Assn., Inc.
707 Sharp Bldg.

LOS ANGELES, CALIFORNIA
Fred M. Smith
Pacific Audit & System Co., Inc.
711 Story Bldg.

MEMPHIS, TENNESSEE
T. E. Moore
Shapiro Positions Exchange
Union Planters Bank Bldg.

MILWAUKEE, WISCONSIN
R. J. Willetts
National Clerical Bureau
6069 Plankinton Bldg.

MINNEAPOLIS, MINNESOTA
W. A. Gilman
James Ells Service
929 Plymouth Bldg.

NEW ORLEANS, LOUISIANA
O. F. West
Commercial Employment Agency
713 Canal Bank Bldg.

NEW YORK, NEW YORK
Albert H. Rohrer
Acorn Employment Service, Inc.
7 Dey Street

OAKLAND, CALIFORNIA
Harry B. Smith
Pacific Audit & System Co., Inc.
1419 Broadway

OKLAHOMA CITY, OKLA.
Juanita Eldridge
Beacon Employers' Service
404 First National Bank Bldg.

OMAHA, NEBRASKA
Harry H. Knapp
Western Reference & Bond Assn.
834 Redick Tower

PHILADELPHIA, PA.
J. D. Stephens
Business Service Co.
1600 Walnut Street

PITTSBURGH, PA.
E. C. Coby
Coby Service Bureau
Bessemer Bldg.

SAN ANTONIO, TEXAS
George T. Ferris
George T. Ferris Service
210 Gunter Office Bldg.

SAN FRANCISCO, CALIF.
Harry B. Smith
Pacific Audit & System Co., Inc.
57 Post Street

SPOKANE, WASH.
J. I. Kinman
Kinman Employment Service
110 Howard Street

ST. LOUIS, MISSOURI
E. T. Hasselbring
Business Service Co.
Chemical Bldg.

SYRACUSE, NEW YORK
R. E. Taylor
Taylor Employment
333 South Warren St.

TOLEDO, OHIO
E. Siefke
Toledo Personal Service Co.
1125 Edison Bldg.

WASHINGTON, D. C.
A. C. Wright
Boyd Employment Service
1333 F. Street, N. W.

Hans Ernst Substitutes At Outstanding Discussion

By Kurt Siems
Sales Engineer, Cincinnati Milling Machine Co.

Cincinnati Chapter—Prevented by a blizzard in New York City from flying to Cincinnati, Malcolm F. Judkins of Firth-Sterling Steel Co. was unable to address the Machinability Group of the Cincinnati Chapter on Dec. 15, as scheduled.

Your reporter, who had been delegated to conduct the proceedings, felt himself particularly fortunate, therefore, to have the immediate and willing acceptance on only a few hours' notice of Hans Ernst, who is in charge of all research activities of the Cincinnati Milling Machine Co., and one of his able assistants, M. E. Merchant.

Mr. Ernst is without a peer in his field, and perhaps because of this fact, combined with the very spontaneity of the meeting, it turned out to be one of the most outstanding discussion groups ever assembled in the history of the Chapter.

Speaking on "Cutting Tools and Machinability of Metals", Mr. Ernst incorporated some of his most recent findings in the research laboratories of the Cincinnati Milling Machine Co.

Cincinnati Chapter is proud and grateful to have this eminent authority as one of its members.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Feb. 7	Rm. 6-120, M.I.T.	H. J. French	Recent Developments in Alloy Steels
Buffalo	Feb. 14	Hotel Buffalo	James McKenzie	Gray Iron
Calumet	Feb. 1			Dinner Dance
Calumet	Feb. 18	Woodmar Country Club, Hammond, Ind.	E. P. Kerruish	Quality Control in a Bearing Manufacturing Plant
Canton-Mass.	Feb. 21			Winter Party
Chicago	Feb. 13	Towers Club	H. B. Schulz	Practical Principles of Electric Furnace Melting
Chicago	Feb. 15			Informal Dinner Dance
Cleveland	Feb. 3	Cleveland Club	John Chipman	Chemical Reactions Involving Liquid Steel and Slags
Columbus	Feb. 11	Fort Hayes Hotel	F. G. Tatnall	Physical Testing
Dayton	Feb. 12	Engineers Club	Bruce W. Gonser	Vapor Phase Protective Coatings
Detroit	Feb. 10	Sak's	E. V. Crane	Metal Flow Theory in Plastic Working of Metals
Hartford	Feb. 11	Hartford Elec. Light Co. Audit.	W. B. Scott	Modern Bronze Alloys
Indianapolis	Feb. 17	Washington Hotel	D. J. Reese	Modern Cast Irons
Lehigh Valley	Feb. 7	Hotel Traylor, Allentown, Pa.		Metallurgical Information Please
Milwaukee	Feb. 18	Athletic Club	S. M. Norwood	Stainless Steels
Montreal	Feb. 3	Windsor Hotel	E. Cartwright	Light Alloy Castings
New Haven	Feb. 20	Hammond Laboratory, Yale Univ.	O. E. Harder	Effect of Lead in Steel
New Jersey	Feb. 17	Essex House, Newark		Information Pleases
New York	Feb. 10	Bldg. Trade Employers Assoc. Club Room	Claire C. Balke	Powder Metallurgy
North West	Feb. 13	Coffman Memorial Union, Univ. of Minn.	E. O. Dixon	Metal Failures in Forged Parts
Notre Dame	Feb. 12	Engineering Audit., Univ. of Notre Dame	J. H. Van Deventer	Today's Challenge to the Engineering Profession
Ontario	Feb. 7	Toronto	A. van Winsen	Metallizing
Peoria	Feb. 10		G. Charlton	An Outline of Valve Developments for Internal Combustion Engines
Philadelphia	Jan. 31	Engineers Club	Gregory Comstock	Powder Metallurgy
Philadelphia	Feb. 28	Franklin Institute	Robert S. Archer	Annual Sauveur Lecture
Pittsburgh	Feb. 13	Roosevelt Hotel	A. L. Boegehold	Selection of Steels in the Automotive Industry
Rhode Island	Feb. 5	Providence Engineering Society Bldg.	E. L. Wood	Metallurgical Problems Encountered in the Manufacture of the Garand Rifle
Rochester	Feb. 10	Chamber of Commerce	Russell Franks	Recent Developments in Corrosion Resisting Steels
Rocky Mountain	Feb. 21	Oxford Hotel, Denver	O. A. Horger	Photo-Elasticity and Strength of Materials
Saginaw Valley Group	Feb. 11	Fischer's Hotel, Frankenmuth, Mich.	E. V. Crane	Plastic Working of Metals
Springfield	Feb. 17	Hotel Sheraton	Hans Ernst	Physics of Metal Cutting
St. Louis	Feb. 21	York Hotel	R. R. Kennedy	Materials Used in Aircraft Construction
Syracuse	Feb. 4	Onondaga Hotel	E. C. Bain	Hardenability
Texas	Feb. 20	River Oaks Country Club	H. W. McQuaid	
Toledo Group	Feb. 24	The Hillcrest	Rep. of Bethlehem Steel Co.	Wire Rope or Sheet Steel
Tri-City	Feb. 11	Hotel Ft. Armstrong, Rock Island, Ill.	G. P. Phillips	Automotive Castings
Washington	Feb. 10	Carlton Hotel	P. D. Merica	George K. Burgess Memorial Lecture
Worcester	Feb. 5	Sanford Riley Hall, Wor. Polytech. Inst.		Making and Shaping of Steel (Movie)
York	Feb. 12		B. H. McGar	Non-Ferrous Metals